Centimeter

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ABSTRACT
        Enrollment levels of high schools are positively
related to the number of courses offered. The most common way to
expand educational opportunities in communities served by small high
schools is to increase enrollment, usually by means of consolidation.
Size, however, is not always the predictor of course offerings, as
some relatively small schools offer numbers of courses that rival the
number offered by considerably larger schools. This study was
designed to analyze the effects on course offerings of factors other
than school size. The analysis is based on the data of the High
School and Beyond Survey conducted by the U.S. Department of
Education. The strategy of the inquiry was to explain the variation
in curricular offerings after the effects of school size were
statistically removed. None of the predictor variables (community
characteristics, spending level, flexibility in the internal
allocation of resources, the external labor market conditions, the
press for achievement, and the presence of a collegial decision
making structure) were found to make a substantive difference in
explaining the variation of course offerings. The data tables point
out inequalities in the educational opportunities being provided for
high school students. In addition, the analysis illustrates how
inadequate school or school district consolidation is likely to be
for broadening educational opportunities at the secondary level.
Table of regression coefficients are included. (ALL)

TRANSCENDING THE EFFECTS OF SCHOOL SIZE

ON THE HIGH SCHOOL CURRICULUM

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Section I: Introduction

It is well known that enrollment levels of high schools are positively related to the discrete number of courses offered by high schools (Barker 1985; Haller et al. 1990; McKenzie 1989; Monk 1987; Monk and Haller 1990). It is less well known that this relationship is characterized by numerous exceptions such that some relatively small schools offer numbers of courses that rival the number offered by considerably larger schools (Lee 1987; Monk 1987). This "over-lap" is troubling from a policy making perspective since a commonly pursued means of expanding educational opportunities in communities served by small high schools are efforts to increase enrollments, usually by means of consolidating separately organized schools. The "over-lap" suggests that there are means by which some small schools are able to offer a complement of courses similar t. what is offered by larger schools without increasing their enrollment. The "over-lap" also suggests that some larger schools are failing to take full advantage of whatever capability their size permits regarding the provision of a broader array of educational opportunities.

The analyses reported here are designed to learn more about how high schools deploy resources for the purpose of offering courses. The focus of the inquiry is on variation in curricular offerings remaining after the effects of high school size (as measured by enrollment) have been removed. The goal of the analysis is to see how much of the remaining variation in the number of courses offered can be explained by structural as well as process attributes of high schools. Particular attention was paid to the explanatory power of various dimensions of administrative leadership. We were interested in determining the degree to which aspects of admini trative leadership are

capable of overcoming the effects of school size on high school curricular offerings.

The balance of the paper is divided into three sections. Attention turns first to a series of conceptual issues that influenced the choice of variables for the analysis. This is followed by a description of the data that were used and the results that were found. The paper concludes with some tentative conclusions and speculation over the implications for policy.

Section II: Constraints on the Offering of Courses

High school curricular offerings will vary for reasons stemming from two conceptually distinct sources. On the one hand there may be differences in the demands communities make on their schools for courses. One community may be very attentive to the academic portion of the curriculum and insist on seeing a broad range of courses including advanced placement courses suited for college bound students. A second community may be much less interested in these courses and place a higher priority on courses that have more immediate vocational implications. A third community may seek to offer as few different courses as possible on the grounds that the taxpayers' responsibility is to provide a common basic program for all students. In such a school multiple sections of a relatively small number of courses would be the result.

On the other hand there are influences on curricular offerings that stem from the supply side. These influences arise from constraints school officials encounter as they seek to provide course offerings. A good example of a supply side constraint arises from the size of the school. As indicated above, high school size is related to curricular offerings, and the

relationship is readily explained in economic terms. In smaller high schools diseconomies of scale are likely to be present, and the resulting higher operating costs can generate downward pressure on the number of different courses that are offered. Even if two communities exerted the identical demands on their schools for additional courses, the expectation is that the smaller of the two schools would provide fewer discrete courses than would the larger.

While this distinction is reasonably clear conceptually, in practice it is difficult to disentangle the effects of demand and supply on the decision to offer or not to offer courses. The impact of school size illustrates the difficulty since school size may also be related to the demands and expectations a community has for 's schools. For the purpose of this research, the primary focus is on the supply side. In other words, the goal is to see how much of the variation in curricular offerings can be explained by constraints schools encounter as they seek to broaden or otherwise modify their curricular offerings. The supply side warrants special scrutiny if for no other reason than the fact that constraints are more readily manipulable via public policy than are what may be deep seated tastes and preferences for one or another type of education.

Social and Economic Characteristics of the Community

It is less than obvious that standard socio-economic status characteristics of communities will have straight forward effects on the breadth of curricula found in high schools. This is particularly true for general measures of curricular breadth that do not distinguish among types of

courses offered. A relatively uneducated community that assigns a low priority to preparing students for post-secondary education may provide a wide array of vocationally oriented courses, and as a result offer a relatively large number of discrete courses. In contrast a highly educated community that seeks to place its youth in colleges and universities may concentrate on a relatively small number of high quality courses and appear to offer a curriculum of limited breadth. The vocationally oriented community may place a similarly high emphasis on the quality of its offerings rather than their breadth.

Measures of the diversity of a community's social and economic characteristics are more directly relevant to the breadth of course offerings. High schools in communities with a more varied mix of parents and taxpayers can be expected to feel more pressure for diversified course offerings. The degree to which this diversity translates into curricular breadth is an empirical question.

Spending on Education

One means of overcoming the effects of low enrollment levels on curricular offerings is to spend at higher levels. There is nothing to prevent a very small high school from offering a full complement of even highly specialized courses if there is willingness to spend at a sufficiently high level. Hedonic wage theory holds that even the most specialized and difficult to hire teaching resources can be hired by the least attractive school if the package of benefits is sufficiently generous.

However, increased curricular breadth is not the only outcome of high education spending levels. A school district may spend at high levels and devote the resources to teacher salaries, to name just one possible result. Thus, while increased spending is one means of overcoming the constraining effects of size, it does not follow that spending more necessarily translates into an increased diversity of curricular offerings.

Internal Resource Allocation Practices and External Labor Market Conditions

Schools can enhance their course offerings to the degree that administrators have flexibility in making teacher assignments. One of the difficulties administrators face in small settings involves the sometimes awkward combinations of teaching talent needed to staff courses. In settings where part-time teachers are difficult to hire (due either to a collective bargaining agreement or to external labor market conditions), administrators can be expected to desire flexibility in making teaching assignments. The idea is to avoid having to find teachers capable of teaching substantially different subject matters. Thus, the hypothesis is that when flexibility is limited and when all else is equal, there will be less ability to offer a broad array of courses than when flexibility is greater.

In addition, external labor market conditions can play an important role. To the degree that administrators have discretion over who they hire, they will be more able to meet demands for additional courses. The availability of a part-time teacher can make it possible to offer courses that would otherwise be impossible for a school. Similarly, the ability to be

selective ought to make it easier to meet whatever need there is for unusual combinations of teacher talent.

Finally, there is an important dimension of internal resource allocation that comes into play as soon as the analysis addresses differences across content areas in the availability of course work. One means of enriching the offerings in one content area is to make do with a less rich offering in one or more other areas of the curriculum. In other words, trades can be make such that courses in one area are "financed" at the expense of courses in other areas. Among the opportunities foregone given the decision to offer courses in one content area are the opportunities to offer courses in other content areas. To the extent that trades along these lines are an important means of financing curricular offerings in the face of size related constraints, there are potentially serious equity issues imbedded in the impact of school size on educational opportunities. Some types of students may be bearing more of the cost of small school size than are others.

The Role of School Process

An additional means by which expanded curricular offerings may be financed involves the degree to which teachers and other educational professionals are willing to make an extra commitment to broadening the educational opportunities available within their respective schools. When teachers and others make this commitment, a possible result is a broadened, more diversified curriculum. In the absence of such a commitment, particular courses would not be offered. With the commitment in place, the courses are forthcoming and perceived needs are met.

In such a setting, the teachers themselves can be viewed as the source of financing for the additional courses. The courses are available thanks to the additional commitment made by the teachers. Their willingness to teach a course above and beyond what might otherwise be expected comes at some cost, and while this cost may never appear within financial records, it is nevertheless real and can have bearing on schooling processes.

For the purpose of this exploration, two sources of "teacher willingness to make an extra commitment" were examined. Both of these grow out of the effective schools literature and reflect the presumption that teachers in effective schools are more likely to make these extra efforts than are teachers in ineffective schools. The next step requires finding a means of distinguishing between effective and ineffective schools, and this led to an emphasis on correlates of school effectiveness that have been reported in the literature.[1] Two correlate in particular were singled out: (1) indicators of a high priority being assigned to improving learning outcomes; and (2) indicators of a collegial administration where teachers as well as parents are involved in substantive decision making.

Section III: Data and Methodology

The data for this study come from various files of the <u>High School and Beyond</u> surveys conducted by the U.S. Department of Education. These data,

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[1] See Rosenholtz (1985), and Purkey and Smith (1983). This is a risky strategy if for no other reason than the fact that most effective schools studies have not dealt with high schools. For an interesting exception, s e Rutter et al. (1979).

collected between 1980 and 1982, include the responses of administrators, teachers, and parents to questions about their schools and communities. Properly weighted, the 1015 schools in the primary sample are representative of all public and private high schools in the United States in 1980.

From the sampled schools we selected a subsample relevant to the policy issues examined here. In particular, we eliminated all private schools, and all specialized schools (those coded as vocational or intended specifically for the handicapped). This left us with a total of 652 "standard" public United States high schools. However, not all of the high schools participated in all phases of the survey. In particular, the teacher and parent files involved a subset of the larger sample. As a consequence when variables coming from these files are used, the sample size drops considerably.

The dependent variables used throughout the analyses are the residuals which arise when the number of unduplicated credits available within a high school is regressed on the enrollment of the school's graduating class. Credits were selected because they capture full as well as part year course offerings. Earlier work focused on counts of the numbers of full year and part year courses, but these efforts were abandoned in part because of the difficulties associated with interpreting the results for part-year courses. The credits are "unduplicated" in the sense that they measure unique courses. Multiple sections of the same course do not add to the number of unduplicated credits offered by a school.

The analysis begins with the residuals for all credits regardless of their location within the high school's curriculum. In addition, the residuals for academic credits only are examined, as are the residuals for mathematics and science course offerings. Mathematics and science courses

were chosen for special attention because of the importance they have been assigned within the ongoing school reform movement.

The independent variables are assigned to the categories explored in the previous section The community characteristics include: the per capita income level for the school's county, the percentage of students in the school classified as being disadvantaged, the percentage of the school's graduating class expected to go to college, and the education level of the students' parents, averaged to the school level.

The spending variable is the beginning BA teacher salary divided by the county's per capita income. It would have been preferable to examine overall spending levels in addition to teacher salary indicators, but the district spending level variable had a peculiar distribution which invited disturbing questions about what it was measuring. The teacher salary variable is expressed as a fraction of the county's per capita income as a means of controlling for the effects of regional differences in the cost of living. The goal is to identify those districts spending at high levels relative to a second local indicator of income levels.

The internal resource allocation variables include: classroom teachers as a percentage of the professional staff; the percentage of classroom teachers who are new; the percentage of classroom teachers with more than 10 years of experience in the school; the percentage of classroom teachers with fewer than 3 years of experience in the school; the percentage of teachers with tenure; and the residuals associated with various areas of the curriculum (vocational and non-mathematics/science to be specific). These residuals measure the degree to which the school is offering an unusually large or small number of courses in the indicated area given its size.

The external labor market conditions are measured by two variables that reflect the principal's perceptions: the degree to which salaries are insufficient to attract teacher candidates, and the degree to which there is a shortage of qualified applicants.

Finally, there are variables intended to capture the two dimensions of effective school correlates: measures of the press for academic achievement, and measures of the degree of collegiality in decision making. Since both administrators and teachers responded to questions focused on these attributes, the perceptions of both were examined.

Relationships among the variables were estimated using multiple regression techniques. The variables were looked at collectively using the categories introduced above. They were also examined individually. Weights were adjusted to avoid artificially inflating tests of statistical significance.

Section IV: Results

Figure 1 displays a scatter plot of the residuals obtained as a byproduct of a least squares regression of the number of unduplicated credits offered by a high school on the size of the high school's graduating class. This regression explained 54% of the variation in the number of credits high schools offer, and each additional member of the graduating class was associated with .25 of an additional unduplicated course credit. The mean number of credits offered by the high schools in this sample was 93.5 with a standard deviation equal to 55.1.

Figures 1, 2, and 3 About Here

Notice the widening of the residual plot as the size of the school increases. This suggests that enrollment is more of a constraining influence in small rather than large high schools. It is worth noting however, that schools with graduating classes equal to roughly 200 students vary substantially in how many unduplicated credits they offer. For example, there are several schools of this size offering 100 fewer credits than could be expected given their size, just as there is one offering more than 200 credits above what its size suggests would be reasonable to expect.

Similar although not identical patterns are revealed in Figures 2 and 3 where the residuals for academic credits and mathematics and science credits are displayed, respectively. The plot for the mathematics and science residuals in particular suggests that there is considerable variation around the regression line in so e of the smallest high schools. In both the case of academic credits in general and science and mathematics credits in particular, the size of the graduating class explains roughly half of the variance in the number of credits offered.

Community Background Characteristics and Spending

Table 1 reports the results of regressing the residuals for all courses, those for academic courses, as well as those for mathematics and science courses on a series of community background and spending attributes. These regression models make it clear that measures of community income and the

incidence of disadvantaged students have relatively l.ttle to do with whether a particular school is above or below the regression line which produced the residuals at hand. The community background characteristics examined (per capita county income, the percentage of disadvantaged students, the percentage of the graduating class going to college, and the average education level of parents) could add only 4 percentage points to the R squared statistic for the all credit residual model. The effect was larger for the academic and science and mathematics residuals, and reached as high as 7 percent for the academic credit residuals.

Table 1 About Here

The signs of the regression coefficients were in line with what seems reasonable with the exception of some of the coefficients for the education levels of parents. The zero-order correlation coefficients for the per capita community income were +.13, +.25, and +.23 for the all, academic, and mathematics-science residuals respectively, and this suggests that high income communities tend to offer a larger and more diverse array of courses. But these are all modest relationships and are perhaps more striking for being below what might have been expected.

The sign for parents education level is puzzling since it suggests that communities with more educated parents are less likely to be above the regression line. This too is a modest relationship, and one that is confined to the total credit count.

We also examined dispersion in the occupations of the parents who were surveyed as part of the study. The standard deviation of parents' occupations

was not related to any of the residuals examined here. These results are not reported in Table 1.

The results for the measure of real spending are interesting. Recall that this variable measures the degree to which spending on teacher salaries (beginning BA teacher salaries to be precise) is high relative to per capita county incomes. It is not a general measure of real spending on education, but instead reflects decisions already made about the degree to which education spending is devoted to teacher salaries.

It is not possible a priori to predict the effect of spending more in real terms on teacher salaries will have on the breadth of curricular offerings. On the one hand, higher salaries will make it possible to hire teachers who are trained to a given level of excellence in a wider range of areas, and this could increase the number of courses offered. On the other hand, the higher salary may permit districts to hire teachers trained to a higher level of excellence in a narrower range of areas, and this could reduce the number of courses offered. Moreover, as teacher salaries reach higher levels, the school cuts into its ability to hire larger numbers of teachers, and this too will reduce the school's ability to offer a broad array of courses.

The results in Table 1 indicate that higher beginning salaries for teachers are negatively related to the number of courses offered in all three areas of the curriculum. The effect is not powerful and adds no more than 4 percentage points to the model's explanatory power, but the direction of the relationship appears to be quite clear. It would be desirable to examine the effects of spending in general on education, but unfortunately this variable was not available.

It is more likely that a general spending variable would be positively related to these residuals than the salary variable. This is true because a general spending variable would capture a willingness on the part of school boards to hire a relatively large number of teachers at a wage equal to the regional average and to thereby broaden the curriculum. Salary variables alone are not capable of discerning this possible effect of spending.

Internal Resource Allocations and External Labor Market Conditions

The rationale for looking at internal resource allocation variables is based on the presumption that greater flexibility will enhance the ability of administrators and teachers to offer courses consonant with community as well as professional expectations. Assuming there is an ever present desire to offer more courses, indicators of greater flexibility in how resources could be deployed were expected to correlate positively with each of the three residual variables.

Table 2 About Here

Table 2 makes it clear that neither the indicators of flexibility (classroom teachers as a percentage of the total professional staff within the building, the percentage of new teachers, and the percentage of teachers with less than 3 years of experience) nor the indicators of reduced flexibility (the percentage of teachers with more than 10 years of experience and the percentage of teachers with tenure) are related to the residual variables. These insignificant relationships are not surprising given how crudely

flexibility is being measured. But there is an alternative explanation for
these results that is more damaging. Specifically, it is hardly obvious that
flexibility will translate into additional courses. Flexibility could also
stimulate efforts to improve the quality of a given array of educational
opportunities. The presumption that there is always a desire to expand course
offerings may be quite faulty.

An additional internal allocation variable that warrants attention is
average class size. Unfortunately, we have not yet devised a method that
cleanly measures class size in these data. Average class size is important
because it reflects a number of prior internal resource allocation decisions.
In this sense it is quite analogous to the teacher salary variable discussed
above. A willingness to tolerate relatively small classes suggests an
interest in offering a broader array of curricular offerings, all else equal.
We can discern two key allocation decisions which permit insight into the link
between spending on education and the range of curricular offerings: (a) the
salaries (as well as other benefits) paid to teachers; and (b) the practices
regarding class sizes and their distribution. It is clear that more needs to
be done with class size variables.

The relationships between the residuals pertaining to vocational as well
as science and mathematics courses are quite interesting. Recall that the
thinking here was that one means of financing a relatively rich offering in
one area of a curriculum involves doing less in some other area. We reasoned
that being above the regression line for academic courses might logically be
associated with being below the regression line for vocational courses. With
this in mind we entered the residual for vocational credits into the
regression model for the academic credit residuals and found a striking

<u>positive</u> relationship. What this tells us is that schools offering unusually large numbers of academic credits also offer unusually large numbers of vocational credits. In other words, larger numbers of academic courses do not appear to be financed via a reduced number of vocational courses. A similarly strong positive relationship emerged when we examined the linkage between the residuals for mathematics and science courses with the residuals for all other academic courses. These results suggest that the sort of triage we envisioned is not an important part of how some high schools overcome the constraints size imparts on their ability to offer courses.

The two variables that were intended to capture the effects of external labor market conditions were related to the residuals, although for one of the variables the direction of the relationship is surprising. The surprising relationship involves the principal's perceptions of shortages in the supply of qualified applicants. The positive direction of this relationship suggests that when a shortage is perceived, the school is more likely to be above the regression line for all three of the curricular areas (total credits, academic credits, and mathematics-science credits). In theory, a shortage of qualified teachers ought to interfere with the ability of administrators to staff courses and thus it seems reasonable to expect shortages to be associated with being below the regression line.

One of the difficulties with this variable is its highly general nature. The severity of shortages can vary substantially within a given labor market. More precise measures of shortages of teachers with particular skills and, even more to the point, with particular combinations of skills would be more likely to have the expected effect on the ability of a school to be above the regression line.

The Role of School Process

Recall that two of the observed characteristics of effective schools were used to distinguish between schools where teachers would be willing to make an extra and not directly compensated effort to expand educational opportunities for their students. One of these characteristics involves the press for achievement; the other involves the presence of a collegial approach to decision making and problem solving. The High School and Beyond data permit measures along these two attributes using observations from two sources: principals and teachers. Table 3 reports the results for administrator perceptions; Table 4 reports the results based on teacher perceptions.

Principal perceptions. The various measures we employed for the emphasis on academic achievement have little discernable impact on whether or not the school rises above or falls below the number of courses expected given its size. This is true in all areas of the curriculum that we examined. It does not appear that a "business-like" emphasis on achievement translates into unusually large numbers of educational opportunities as measured by the number of credits offered.

Table 3 About Here

In contrast, a few of the results for the "shared decision making" variables are related to whether the school is above or below the regression

line, although in several instances the direction of the relationship is puzzling. For example, the principal's perception that the teachers' organization is cooperative is negatively related to each of the residuals we studied. Perhaps "cooperation" in this context has more to do with complacency, and what we are viewing may be evidence of a joint willingness of administrators and teachers to provide less for students than might be expected given other characteristics of the school.

A number of the other results point in a different direction. For example, instances where the principal considers the staff to be involved in decision making is positively related to the residuals for the science and mathematics residuals. Similarly, measures of parental involvement and cooperation are positively related to the residuals for the science and mathematics credits and the total credits, respectively.

Teacher perceptions. With the exception of the positive relationship between the number of daily interruptions and the residuals for all credits, teacher perceptions of the press for achievement were not related to the school being either above or below the various regression lines we have been considering. These results are consistent with what we found regarding principal perceptions. It appears that indicators of the seriousness with which learning is taken within a high school have little to do with the ability and/or the willingness to depart from what is expected given the school's size.

Table 4 About Here

It may be that the press for achievement translates more into a desire to do a better job at providing a given range of educational opportunit⌐ than it does into broadening the range of what schools offer, but on its face this seems implausible. Surely there is interest within American high schools in offering specialized courses that respond to the wide ranging interests of students. Moreover, we know for a fact that some school districts provide very large numbers of different courses.

As was the case for the perceptions of principals, teacher reported evidence of a collegial working environment is related to the availability of courses. Both the academic and the science mathematics residuals were positively related to teacher held beliefs that teachers influence the curriculum. These results suggest that teacher involvement in decision making translates positively into the offering of additional courses.

But, for all three residuals, a surprising negative relationship appeared for the variable measuring teachers' assessments of how supportive the administration is of the staff. In instances where administrative support is high, the school tended to be below the regression line for all three areas of the curriculum. These results are reminiscent of the finding reported in Table 3 where the principal's perception that teachers were cooperative was associated with being below the regression lines. Again, we may be picking up the effects of a shared complacency wherein high levels of cooperation between administrators and teachers translates into something quite questionable from the perspective of students.

Section V: Conclusions

The interpretation of these results is problematic because only one
dimension of educational opportunity is being addressed. For example, it may
be the case that wheneve- a school falls below the regression line in terms of
the number of courses it offers, it more than makes up for the disparity by
providing higher levels of quality in what it does offer. Perhaps. But can
the mere possibility of such recompense warrant indifference to the kind of
inequality described so clearly by the three scattergrams presented in this
paper? Moreover, even if high schools make up for the inequalities revealed
by the scattergrams by excelling along other dimensions, is it prudent to
assume that the substitution is costless? Can the availability of a truly
first rate basic English program really make up for the absence of advanced
mathematics and science in a curriculum? Where ought the burden of proof lie
in such a debate?

The results presented here are disturbing for at least two reasons.
First, there is the magnitude and nature of the inequalities in curricular
offerings revealed by the scattergrams. The reality is that high school size
is important but certainly not determinative of how broad the range of courses
will be. The high schools we studied vary dramatically in those course
offerings after the effects of school size were removed. A second aspect of
this reality is that it is not simply a matter of the more advantaged school
districts being the ones above the regression lines. The background
characteristics we examined were remarkably limited in their ability to
explain differences in curricular offerings.

The second reason the results are disturbing is that they show clearly
how little is known about what explains the variation in curricular offerings.
We need to face up to the fact that none of the variables measuring
flexibility in the internal allocation of resources, the external labor market
conditions, the press for achievement, and the presence of a collegial
decision making structure made much of a substantive difference in explaining
the residual variation. The one attribute that did make a difference was the
willingness of the school to offer courses in other areas of the curriculum.
And while the strong positive direction of this relationship came as a
surprise, it is understandable but not very enlightening. It really amounts
to just a different way of admitting to the ignorance that persists. We are
in effect saying there are some schools that somehow seem able to overcome the
effects of size, and when they do they seem to do it across the board.

Aside from the interesting theoretical issues that are raised by a
desire to understand how fiscal resources are translated into educational
opportunities, there are practical and important policy issues that need to be
resolved. The scattergrams presented in Figures 1-3 point out striking and
disturbing inequalities in the educational opportunities being provided for
high school students. The scattergrams also illustrate how inadequate school
or school district consolidation, one of the traditional policy remedies, is
likely to be for broadening educational opportunities at the secondary level.

The magnitude of this residual variation in itself is disturbing. Our
ignorance of from whence the inequality comes is a further embarrassment and
ought to serve as an inspiration for more thorough analysis.

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-400+                                                                           +
      +-+----+----+----+----+----+----+----+----+----+----+----+----+----+----++
       -200      0      200     400     600     800    1000
```

Residual

1978-1979 NUMBER OF GRADUATES

652 weighted cases plotted.

Figure 1:   Plot of Residuals for ALL Credits with High School Graduating Class Size

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1978-1979 NUMBER OF GRADUATES

652 weighted cases plotted.

Figure 2: Plot of Residuals for Academic Credits With High School Graduating
Class Size

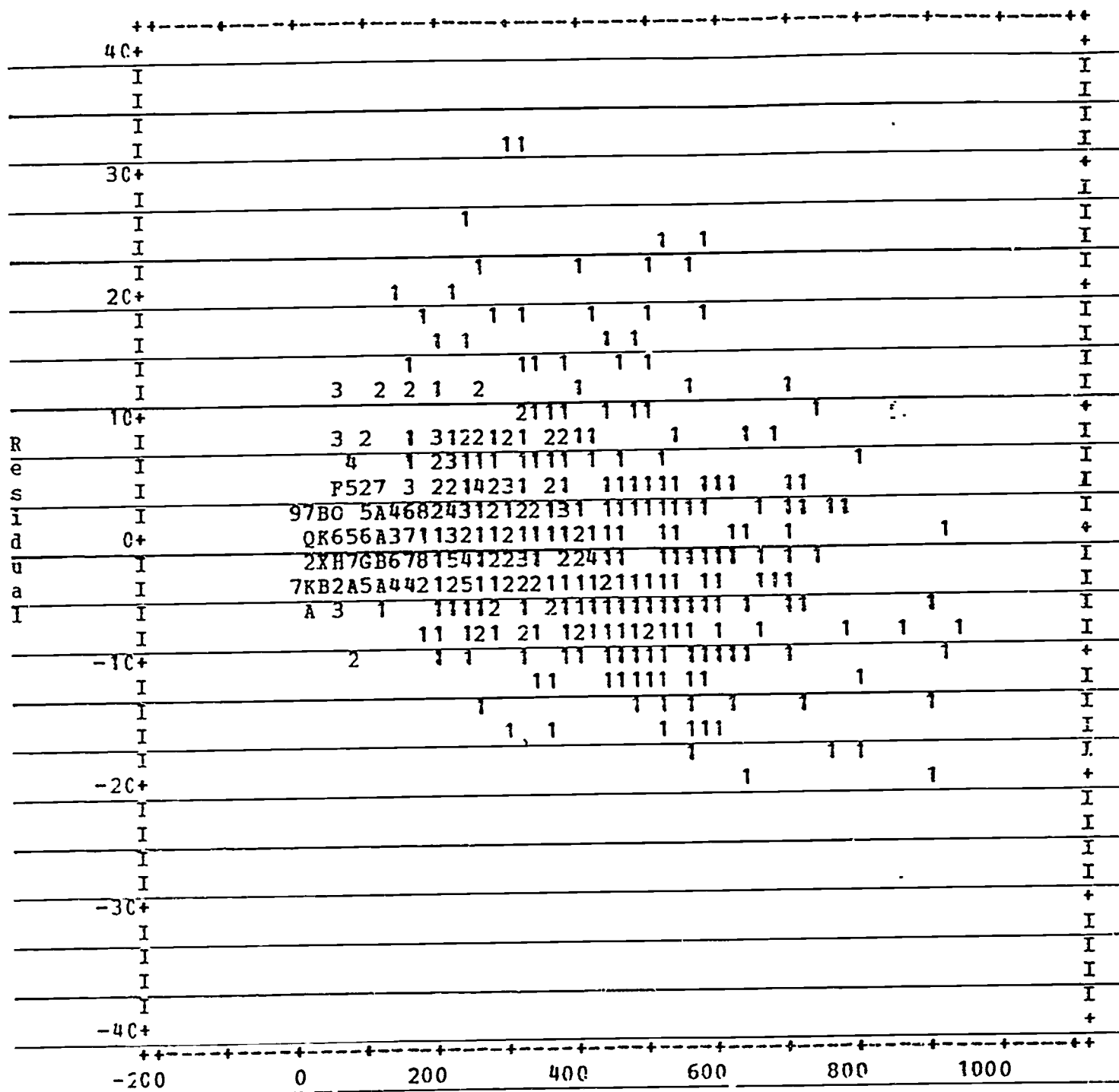1978-1979 NUMBER OF GRADUATES

649 weighted cases plotted.

Figure 3: Plot of Residuals for Science and Mathematics Credits With High School Graduating Class Size

Table 1
DEPARTURES FROM SCALE EXPECTATIONS BY COMMUNITY CHARACTERISTICS AND SPENDING ATTRIBUTES
Regression Coefficients With Standard Errors in ()

COMMUNITY BACKGROUND AND SPENDING CHARACTERISTICS	RESIDUALS FOR ALL CREDITS			RESIDUALS FOR ACADEMIC CREDITS			RESIDUALS FOR SCIENCE AND MATH CREDITS		
County Per Capita Personal Income 1981	.002** (000)	.003** (.001)		.002** (.000)	.002** (.000)		.0006** (.0001)	.0005** (.0002)	
Percent of Students Classified Disadvantaged	.028 (.080)	-.23* (.13)		-.004 (.037)	-.08 (.06)		.008 (.011)	-.01 (.02)	
Percentage of Graduating Class Going to College	.060 (.091)	.09 (.16)		.075* (.043)	.008 (.078)		.029** (.013)	.01 (.02)	
Average Education Level of Parents		-6.3* (3.7)			.38 (1.8)			-.27 (.51)	
Beginning BA Teacher Salary Divided by County Per Capita Personal Income 1981			-18.5** (6.5)			-15.5** (3.1)			-4.8** (.9)
Constant	-24.6** (7.8)	-5.6 (12.8)	21.3* (7.6)	-21.7** (3.7)	-15.1** (6.1)	17.8* (3.6)	-6.6** (1.1)	-4.0** (1.8)	5.5** (1.1)
R^2	.02	.04	.01	.07	.06	.04	.06	.05	.04
F	3.8**	1.8	8.1**	14.5**	3.2**	25.3**	13.5**	2.3*	26.0**
n	594	191	652	594	191	652	592	190	649

* $p < .10$
** $p < .05$

Table 2
DEPARTURES FROM SCALE EXPECTATIONS BY INTERNAL RESOURCE ALLOCATION AND LABOR MARKET CONDITIONS

Regression Coefficients with Standard Errors in ()

INTERNAL ALLOCATION AND LABOR MARKET CHARACTERISTICS	RESIDUALS FOR ALL CREDITS	RESIDUALS FOR ACADEMIC CREDITS			RESIDUALS FOR SCIENCE AND MATH CREDITS		
Classroom Teachers as Percentage of Total Professional Staff	.20 (.31)	-.03 (.16)		-.09 (.15)	-.00 (.05)		-.06 (.06)
New Teachers as a Percentage of All Classroom Teachers	-.05 (.10)	-.03 (.05)		-.03 (.05)	-.01 (.01)		-.01 (.02)
Percentage of Teachers at School > 10 Years	-.12 (1.1)	-.22 (.54)		-.26 (.51)	-.13 (.17)		-.21 (.15)
Percentage of Teachers at School < 3 Years	1.3 (1.7)	-.13 (.85)		-.47 (.81)	-.06 (.27)		.11 (.23)
Percentage of Teachers With Tenure	.05 (.15)	.00 (.07)		-.01 (.07)	.02 (.02)		.02 (.02)
Residual of Vocational Credits			.32** (.02)	.24** (05)			
Residual of Non Science-Math Academic Credits						.27** (.01)	.29** (.02)
Principal Perceives Salaries Insufficient	-3.8** (1.6)	-1.7** (.8)		-1.2 (.8)	-.64** (.26)		-.21 (.23)
Principal Perceives Shortage of Qualified Applicants	3.4** (1.7)	2.1** (.9)		1.7** (.8)	.82** (.27)		.23 (.24)
Constant	-17.2 (34.2)	4.6 (17.3)	.15 (.62)	10.2 (16.3)	-.9 (5.4)	.44** (.18)	4.6 (6.2)
R2	.05	.05	.20	.16	.08	.44	.50
F	1.4	1.5	166.8**	4.7**	2.5**	435.2**	20.6**
n	207	207	650	207	207	558	175

* $p < .10$
** $p < .05$

Table 3
DEPARTURES FROM SCALE EXPECTATIONS BY PRINCIPAL PERCEPTIONS OF PRESS FOR ACHIEVEMENT AND SHARED DECISION MAKING PROCESSES
Regression Coefficients with Standard Errors in ()

PRINCIPAL PERCEIVED PRESS FOR ACADEMIC ACHIEVEMENT	RESIDUALS FOR ALL CREDITS		RESIDUALS FOR ACADEMIC CREDITS		RESIDUALS FOR SCIENCE AND MATH CREDIT	
School Has Effective School Plan	17.4 (12.3)		1.1 (5.9)		.23 (1.9)	
Effective School Plan is Written	-8.6 (9.2)		-6.1 (4.4)		-1.3 (1.5)	
Parents Notified if Grades are Low	21.2 (16.7)		12.3 (7.9)		4.8* (2.7)	
Parents Notified After 2·3 Absences	13.0 (22.2)		7.9 (10.5)		1.1 (3.5)	
Increased Homework	1.5 (8.1)		1.6 (3.9)		.01 (1.3)	
Staff Has Set High Standards	3.7 (4.2)		2.4 (2.0)		.39 (.66)	
DEGREE OF SHARED DECISION MAKING PRINCIPAL PERCEPTIONS						
Staff Responsible for Analyzing School Problems		6.8 (4.6)		3.2 (2.1)		1.4** (.7)
Teacher's Organizations Cooperative		-6.2* (3.7)		-3.7** (1.7)		-1.1** (.54)
Parents Cooperative		12.6* (7.0)		2.2 (3.2)		.6 (1.0)
Staff Involved in Decision Making		-3.4 (7.4)		.8 (3.4)		.6 (1.1)
Parents Help Advise Re School Policy		15.7 (10.2)		6.5 (4.7)		2.7* (1.5)
Constant	-51.9* (30.1)	-54.7 (45.4)	-25.0* (14.3)	-16.6 (21.1)	-5.9 (4.7)	-8.1 (6.7)
R^2	.07	.12	.09	.14	.06	.19
F	1.1	1.8	1.5	2.2*	1.0	3.1**
n	99	73	99	73	99	72

* $p < .10$
** $p < .05$

Table 4
DEPARTURES FROM SCALE EXPECTATIONS BY TEACHER PERCEPTIONS OF PRESS FOR ACHIEVEMENT AND SHARED DECISION MAKING PROCESSES
Regression Coefficients with Standard Errors in ()

TEACHER PERCEIVED PRESS FOR ACADEMIC ACHIEVEMENT	RESIDUALS FOR ALL CREDITS		RESIDUALS FOR ACADEMIC CREDITS		RESIDUALS FOR SCIENCE AND MATH CREDITS	
School Has Effective School Project	6.4 (9.2)		6.5 (4.5)		1.6 (1.4)	
Number of Daily Interruptions	6.6* (3.6)		1.2 (1.8)		-.31 (.55)	
Minutes of Homework Assigned	1.3 (4.8)		.78 (2.3)		-.07 (.73)	
Percentage of Classtime Devoted to Instruction	5.7 (4.4)		2.2 (2.1)		.91 (.67)	
DEGREE OF SHARED DECISION MAKING TEACHER PERCEPTIONS						
Teacher Believe They Influence Curriculum		4.3 (3.2)		4.3** (1.5)		.79* (.47)
Average Time Spent Planning With Other Teachers		5.2* (3.0)		1.9 (1.4)		.70 (.45)
Number of Visits to Other Teacher's Classrooms		2.5 (5.0)		3.7 (2.4)		.63 (.75)
Staff Participates in Decision Making		-2.5 (4.4)		.75 (2.1)		.63 (.66)
Administration Supportive of Staff		-5.4* (3.2)		-5.4** (1.5)		-1.7** (.48)
Constant	-84.1** (40.5)	-1.6 (15.3)	-35.3* (19.6)	-5.9 (7.1)	-8.9 (6.2)	-.9 (2.3)
R^2	.02 1.5	.05 2.9**	.01 1.1	.10 7.2	.01 1.0	.08 5.0**
n	313	313	313	313	313	313

* p < .10
** p < .05

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END

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